

implanted with ions and that they are the sites of the emitter tips, as stated in column 3, lines 52-53. Further, the statement "having been implanted with ions" (column 3, line 52) needs to be read in context with the preceding paragraph (column 3, lines 36-51) that discusses the formation of the wells. This statement clearly refers to adding dopants to form either a uniform N-type or a uniform P-type conductivity well. This is consistent with the Figures in Doan et al., wherein cathode layer 12 and micro-cathode 13 are uniformly cross-hatched, indicating uniform (i.e., non-layered) structures.

In contrast, Applicant's claimed invention specifically calls for an implantation to form an implantation layer or an embedded layer within the emitter itself. This is different from an initial implantation used to form the material making up the bulk of the cathode tip.

"Embedded" and "Implanted" Limitations

As stated in the previous Amendment and Response, all the words of a claim must be given patentable weight. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is contained in the ... claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). See also M.P.E.P. section 2131.

Applicant reiterates the position set forth in the previous Amendment and Response that Doan et al. only discloses an oxide coating. As discussed above, the oxide coating cannot be said to be a product of an implantation process. An implanted oxide layer, as described in claim 1, is a structurally different element than an oxide coating as described in Doan et al. An imbedded layer, as described in claim 14, is also a structurally different element than an oxide coating as described in Doan et al. These are limitations which cannot be ignored. The claims must be analyzed as a whole in light of and consistent with the specification and considering all claim limitations. When evaluating the scope of a claim, every limitation in the claim must be considered. See, e.g., *In re Ochiai*, 71 F.3d 1565, 1572, 37 USPQ2d 1127, 1133 (Fed. Cir. 1995).

In view of the above, Applicant respectfully requests withdrawal of the anticipation

rejection of claims 1-3, 5, 7, 9, 11, 13-26, and 33-35, and allowance of same.

*Functional Limitations of the Claims*

The Examiner asserts that the functional limitations in certain of the claims cannot be given patentable weight because they are in narrative form. In particular, The Examiner states that:

In order to be given patentable weight, a functional recitation must be expressed as a “means” for performing the specified function, as set forth in 35 USC 112, 6<sup>th</sup> paragraph and must be supported by recitation in the claim of sufficient structure to warrant the presence of the functional language. *In re Fuller*, 1929 C.D. 172; 388 O.G. 279.

This position does not reflect the current state of the law. There is no legal or procedural requirement that functional limitations must be set forth in “means for” format under 35 U.S.C. 112, 6<sup>th</sup> paragraph. The M.P.E.P., section 2173.05(g) addresses the issue of functional claim limitations and does not even mention 35 U.S.C. 112, 6<sup>th</sup> paragraph. Further, this section of the M.P.E.P. provides specific examples of how functional limitations can be presented in claims, and none of the examples are in the “means for” format of 35 U.S.C. 112, 6<sup>th</sup> paragraph.

As stated in M.P.E.P. section 2173.05(g):

a functional limitation must be evaluated and considered, just like any other limitation of the claim, for what it fairly conveys to a person of ordinary skill in the pertinent art in the context in which it is used. A functional limitation is often used in association with an element, ingredient, or step of a process to define a particular capability or purpose that is served by the recited element, ingredient or step.

It is thus abundantly clear that there is no prohibition against functional limitations in claims, and that they can be expressed “narratively” rather than in “means for” format. There is nothing inherently wrong with defining some part of an invention in functional terms. Functional language does not, in and of itself, render a claim improper. *In re Swinehart*, 439 F.2d 210, 169 USPQ 226 (CCPA 1971).

Applicant therefore respectfully requests that the Examiner give the functional limitations in claims 2, 3, 5, 7, 9, 11, 13, 15, 17, 21, 27-33 and 36 the proper patentable weight to which Applicant is entitled under the law. Applicant further respectfully requests prompt allowance of these claims.

### **§103 Rejection of the Claims**

#### **Rejections in View of Doan et al.**

Claims 4, 6, 8, 10, 12, and 36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Doan et al. In particular, the Office Action continues to assert that it would have been obvious to one of ordinary skill in the art to modify (“rearrange”) the oxide layer of Doan et al. to arrive at Applicant’s claimed invention.

Applicant respectfully maintains that the layer of Doan et al. cannot be merely “rearranged” to arrive at Applicant’s claimed invention. The Examiner assumes that a coating, which resides atop a surface of the emitter, is identical to and interchangeable with an ion-implanted region embedded within the body of the emitter at the surface. However, the implantation of ions represents a fundamentally different structure than a surface coating. An implanted region is formed within the matrix of the material rather than resting atop the material. Thus, as just one example of the differences, providing a surface coating on the emitter tip changes the spacing between the emitter (cathode) and the gate, whereas an ion-implanted layer does not. Thus, even if a coated and an implanted layer could somehow be interchanged, the device would not function in the same way.

In response to Applicant’s argument regarding implanted/embedded layers as provided in the last Amendment and Response, the Examiner cites U.S. Patent No. 5,688,707 to Lee et al. The Examiner states on page 6 of the Office Action (emphasis added below) that Lee et al. discloses in col. 2, lines 64-67 and col. 3, lines 1-3, “a method of manufacturing a field emitter comprising forming a silicon oxide layer embedded on the upper part of [the] silicon layer by means of oxidation resulting in cone-shaped field emitter tips.”

A closer reading of Lee et al. reveals that this statement is incorrect. First, nowhere in

Lee et al. is discussed an “embedded” an oxide layer. Rather, the oxide layers are formed atop other layers as a coating. Second, the oxide layers serve as masks in the fabrication process that are later etched away (see, e.g., col. 1, lines 38-61; col. 2, lines 44-48; FIGS. 1A-1E), so that the final emitter structure has no coating layer at all. Thus, the Lee et al. reference has only minimal relevance to Applicant’s claimed invention.

Applicant reasserts that the embedded/implanted layer of Applicant’s claimed invention is nowhere to be found in or suggested by the cited references. Further, the notion of somehow re-arranging the coating of Doan et al. to arrive at Applicant’s claimed embedded/implanted layer fails to recognize the fundamental differences between a coating and embedded/implanted layer. There would be no likelihood of success in attempting the re-arrangement, and hence no motivation to do so. Accordingly, a *prima facie* case for obviousness has not been made with respect to the cited claims. Applicant therefore respectfully requests that the rejection be withdrawn and the claims allowed.

Claim 36 includes the “implantation” limitation for the emitter. As stated above, this structural limitation differs significantly from a surface coating. The Office Action falls short of making a *prima facie* case for obviousness for claim 36 because the “implantation” limitation is not present in the cited prior art.

Applicant therefore respectfully requests that the rejection of claims 4, 6, 8, 10, 12, and 36 be withdrawn and the claims be allowed.

#### Rejections in View of Doan et al. and Greschner

Claims 27-32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Doan et al. and further in view of Greschner et al. (U.S. Patent No. 5,817,201).

Applicant submits the Office Action fails to make a *prima facie* case for obviousness because the “embedded layer” claim limitation is nowhere found in the cited prior art. Like Doan et al., Greschner discloses providing an external coating of the tip body (9). There is no discussion in Greschner of an embedded layer as the term is used in Applicant’s claimed invention. Further, Applicant maintains that Doan et al. does not include an embedded layer, as

explained above. Rather, Doan et al. only teaches the use of an external coating.

Finally, as discussed above, Lee et al. sheds no light on the Examiner's position that a coating layer is somehow the same as an embedded/implanted layer. Thus, the combination of Doan et al. and Greschner (even in view of Lee et al. ) does not yield all the limitations of Applicant's invention as claimed in claims 27-32.

Applicant therefore respectfully requests that the rejection of claims 27-32 be withdrawn and the claims allowed.

### CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney, Joe Gortych, at (802) 660-7199 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

YONG-JUN HU


By his Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.  
P.O. Box 2938  
Minneapolis, MN 55402  
(612) 349-9587

Date

9 August 2002

By

  
Timothy B. Clise  
Reg. No. 40,957

CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 9th day of August, 2002.

Name

Tina Kohout

Signature

Z. Kohout